

Application Serial No. 10/043,515

Docket No. 2000-020RCE
PATENTREMARKS

Claims 1-40, 42-46, 51, and 53-83 were pending. Claims 1, 9, 23, 36, 39, 42,-44, 46, 51, 59, 71, 77-79, and 81 are amended. Support for the amendment can be found, *inter alia*, in claim 22, which has been cancelled. No new matter has been added. The applicant requests reconsideration in light of the following remarks.

1. Rejections under Section 101

Claims 1, 39 and 71 are rejected under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter. The Examiner states that “[t]he language of these claims (e.g. ‘experiment design’, ‘experimental matrix’, ‘matrix elements’, ‘process conditions’, ‘experimental results’, ‘library of materials’) raise a question as to whether the claims are directed merely to an abstract idea that is not tied to a technological art, environment or machine which would result in a practical application producing a concrete, useful, and tangible result to form the basis of statutory subject matter under 35 U.S.C. 101.” Office action at pages 2-3. The Examiner then suggests that “if claim 1 was amended to recite a computer-implemented method and required performance of a result outside of a computer, it will be statutory in most cases since use of technology permits the function of the descriptive material to be realized.” Office action at page 3. In response to the applicant’s previous remarks on this point, the Examiner states that “claim 1 does not recite a computer-implemented method while claims 1, 39 and 71 do not present the result(s) to a user via an interface, such as a display.” Office action at page 59.

But the applicant respectfully submits that section 101 does not require that methods that may involve some degree of computer processing be identified as “computer-implemented”, or that claims directed to such methods (or analogous computer program products) expressly recite the presentation of results to a user via an interface. The MPEP explains that an application should be rejected as being directed to an abstract idea “[o]nly when the claim is devoid of any limitation to a practical application in the technological arts”. *See* MPEP § 2106(II)(A), p. 2100-7 (citing *In re Musgrave*, 431 F.2d 882, 893, 167 USPQ 280, 289 (CCPA 1970) and *In re Foster*, 438 F.2d 1011, 1013, 169 USPQ 99, 101 (CCPA 1971)). More specifically, a claimed

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computer-related process recites statutory subject matter if it either: "(1) result[s] in a physical transformation outside the computer for which a practical application in the technological arts is either disclosed in the specification or would have been known to a skilled artisan . . . , or (2) [is] limited by the language in the claim to a practical application within the technological arts . . ." MPEP § 2106(IV)(B)(2)(b), p. 2100-15. Indeed, the MPEP explains that "[a] claimed process is clearly statutory if it results in a physical transformation outside the computer", and identifies two types of out-of-computer process activity that qualify as "safe harbors" of statutory subject matter under section 101. *See id.*

One of these safe harbors encompasses processes that include "physical acts to be performed outside the computer independent of and following the steps to be performed by a programmed computer, where those acts involve the manipulation of tangible physical objects and result in the object having a different physical attribute or structure" (so-called "Post-Computer Process Activity"). MPEP § 2106(IV)(B)(2)(b)(i), p. 2100-15. Thus, "if a process claim includes one or more post-computer process steps that result in a physical transformation outside the computer (beyond merely conveying the direct result of the computer operation) the claim is clearly statutory." *Id.* The applicant submits this is so regardless of the language of the preamble, or of whether results are displayed to a user.

The present claims as currently presented fall squarely within at least this safe harbor under section 101. Whether or not its preamble expressly a "computer-implemented method", claim 1 is clearly directed to a computer-related method: the claim expressly recites the provision to a remote user at a first location of "a computer-implemented experiment design tool for generating an experiment request for execution of a set of experiments" and the receipt at a second location of "a first experiment request for a set of experiments to be performed at the second location, the request including a first experiment design generated by the experiment design tool". The claimed method is statutory whether or not the subsequent steps are implemented in a computer -- the next two steps require the preparation of "a first library of materials" that is made up of "actual compounds, compositions, materials or mixtures" and the application of "process conditions to the members of the first library of materials . . . to transform at least one of

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the starting materials into at least one product”, and the application of a specified “screening method to the members of the first library of materials at the second location to generate experimental results”. Analogous transformations are implicit in claims 39 and 71 (*see e.g.*, claim 39: “receiving at the first location experimental results obtained at the laboratory by applying the process conditions to a library of materials corresponding to the experiment matrix to transform at least one of the starting materials into at least one product and applying the specified screening method”).

Each of these claims is thus based on the transformation of actual compounds, compositions, materials or mixtures into products – a transformation that necessarily occurs in the physical world and that is precisely the sort of “post-computer process steps that result in a physical transformation outside the computer” that render the claim “clearly statutory” according to the MPEP. Compare MPEP § 2106(IV)(B)(2)(b)(i), p. 2100-16 (offering as example of “post-computer process activity” “[a] method of controlling a mechanical robot which relies upon storing data in a computer that represents various types of mechanical movements of the robot, using a computer processor to calculate positioning of the robot in relation to given tasks to be performed by the robot, and controlling the robot's movement and position based on the calculated position”).¹ Significantly, nothing in the MPEP suggests that the particular wording of a claim’s preamble is relevant to this analysis, or requires that computing results be displayed. The applicant submits that claims 1, 39 and 17 are statutory as currently presented and requests that the rejections under section 101 be withdrawn.

2. Rejections under Section 102 and 103

a. Claims 1-3, 9-16, 24, 26-27, 29, and 31-38

Claims 1-3, 9-16, 24, 26-27, 29, and 31-38 are rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,329,139 (“Nova”). The applicant respectfully disagrees.

¹ Claim 1 also falls within a second section 101 safe harbor recognized in the MPEP, which encompasses processes that include manipulation of data that represents physical objects or activities (so-called “Pre-Computer Process Activity”). See MPEP § 2106(IV)(B)(2)(b)(i), p. 2100-16. The final two steps of claim 1 recite the application of a “screening method to the members of the first library of materials at the second location to generate experimental results” and the provision of the experimental results in electronic form to the remote user, and therefore encompass the transformation of electronic signals that represent physical objects, further removing the claim from the realm of abstract ideas.

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As amended, claim 1 is directed to a method in which a computer-implemented design tool is provided to a remote user at a first location. The computer-implemented design tool enables the user to generate an experiment request for execution of a set of experiments, which request includes an experiment design that defines an experiment matrix having a plurality of matrix elements, one or more starting materials assigned to the matrix elements, and one or more process conditions and a screening method to be applied to the matrix elements.

According to the claimed method, an experiment request for a set of experiments is received at a second location that is remote from the first location. The experiment request includes an experiment design generated by the experiment design tool. A library of materials is prepared at the second location according to the received experiment design, the specified process conditions are applied to the members of the library of materials to transform at least one of the starting materials into at least one product, and the specified screening method is applied to the members of the prepared library of materials at the second location to generate experimental results. Finally, the experimental results are provided to the remote user at the first location in the form of electronic data describing the results.

Although Nova may disclose the use of computer software in the organization, planning and design of chemical experiments using these matrices-with-memories, it does not disclose the use of such software to enable a remote user to generate an experiment request that includes an experiment design defining an experiment matrix, starting materials, process conditions and screening methods, as claim 1 requires. Specifically, as explained in the previous response, Nova fails to disclose, or even suggest, the generation or use of an experiment design that includes electronic data that defines an experiment matrix, starting materials assigned to elements of the experiment matrix, and process conditions and a screening method to be applied to the matrix elements, as claim 1 requires, or the receipt of such an experiment design from a user at one location and the execution of the experiment design by a research laboratory at a second, different location, as the claim also requires.

Claim 1 has been amended to recite that the experiment design tool operates to generate “an experiment request for execution of a set of experiments”, where the experiment request includes electronic data that embodies the experiment design set out in the original claim. Amended claim 1 further specifies that such an experiment request is received at the second location, and the included experiment design is executed as previously discussed. The applicant notes that the Examiner has previously recognized, in the context of original claim 22, that Nova does not disclose the submission of experiment requests over a network, and submits that for this reason, in addition to the reasons set out above and in the previous response, Nova cannot anticipate claim 1, or dependent claims 2, 3, 9-16, 24, 26-27, 29 and 31-38, all of which depend directly or indirectly from claim 1 and therefore include all of the limitations of that claim. The rejection under 35 U.S.C. § 102(e) as to these claims should therefore be withdrawn.

The applicant recognizes that the Examiner has previously indicated (again, in the context of claim 22) that the submission of experiment requests is allegedly disclosed in William J. Lennon *et al.*, “Using a Distributed Mini-computer Network to Automate a Biochemical Laboratory” (publication information unknown) (“Lennon”). Lennon discloses the use of a distributed network of computers to automate a biochemical laboratory. Lennon’s stated goal is “to automate an integrated laboratory”, which it proposes to do by automating three traditional laboratory roles – those of Chemist, Technician, and Instrument Operator. See Lennon, page 156, Introduction, paragraphs 1 & 3. Regarding experiment requests, the Examiner cites Lennon’s description of a “Laboratory Control System” (pp. 159-160), but this passage says nothing about “experiment requests” of any kind, much less experiment requests that include experiment designs having the specific characteristics recited in the present claims.

The passage cited by the Examiner covers five short paragraphs of Lennon. The first and longest of these is concerned principally with “operator virtual machines”, which, as explained elsewhere in Lennon, are responsible for “guid[ing] instrument[s] in the performance of [their] chemical procedures, notif[ying] the technician [virtual machine] upon completion, and report[ing] operational irregularities”. See Lennon, p. 159, lines 5-6. According to the cited passage, these operator machines are programs that must provide for accurate operation of a corresponding instrument, and must provide an

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interface that provides for complete exercise of the instrument's abilities. *See* p. 159, lines 52-55. Nothing in this paragraph says anything about the generation or receipt of experiment requests for execution of a set of experiments as recited in the present claims.

The next paragraph of the cited passage of Lennon describes the authors' approach to programming the disclosed Laboratory Control System, which is based on using an interpreter for a set of high level instructions appropriate to each instrument. *See id.*, lines 58-59. Again, this says nothing about the generation or receipt of experiment requests.

The next two paragraphs include a quotation defining sequential processes, which are described as “<processor,program> pairs”, and a brief note suggesting the importance of this definition in a networked environment. *See* Lennon, page 160, lines 1-6.

Although this passage does mention a “network of computers”, it also says nothing about the generation or receipt of experiment requests as recited in the present claims.

Finally, the cited passage includes a paragraph discussing so-called “biochemist” and “technician virtual machines”, which are described as “consist[ing] of a large number of cooperating tasks that process data”. *Id.*, lines 7-8. In this regard, Lennon concludes by stating that data must be “coherently stored and conveniently available to a wide variety of tasks” because it “is not solely used by the programs that receive or create it”, and that this activity “is coordinated through a data-base manager”. *Id.*, lines 8-10. Although this passage does mention the creation and receipt of data by computer programs, this hardly amounts to a disclosure of disclose the generation or receipt of experiment requests as recited in the present claims.

Thus, the applicant submits that Nova and Lennon cannot be combined to reject amended claim 1, or dependent claims 2, 3, 9-16, 24, 26-27, 29 and 31-38, under section 103.

b. Claims 39-40, 42-45, and 57-58

Claims 39-40, 42-45, and 57-58 are also rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Nova. Claim 39 is an independent claim directed to a computer-implemented method for obtaining experimental results for a set of experiments. The method includes the steps of generating at a first location an experiment request embodying an experiment design that defines a set of experiments,

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communicating the experiment request to a laboratory at a second location for execution, and receiving at the first location experimental results obtained by execution of the set of experiments at the laboratory. As in claim 1, the experiment design includes an experiment matrix, one or more starting materials assigned to the matrix elements, and one or more process conditions to be applied to the matrix elements, such that each of a plurality of matrix elements being defined by a unique combination of starting materials and/or process conditions. The claim also specifies that the experiment design also defines a screening method to be applied to generate the experimental results.

Claim 39 thus includes limitations analogous to those discussed above in the context of claim 1 (albeit from the perspective of the user, as opposed to the laboratory as in claim 1); claims 40, 42-45 and 57-58 are dependent claims based on claim 39 and thus include all of the limitations of that claim. Accordingly, claims 39-40, 42-45 and 57-58 are allowable for at least the reasons discussed above in the context of claim 1.

c. Claims 51, 59-66, and 68-70

Claims 51, 59-66, and 68-70 are also rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Nova. Claim 51 is an independent claim directed to a computer-readable storage medium tangibly embodying a research system program comprising instructions operable to cause a programmable processor to perform a sequence of steps directly analogous to the method steps recited in claim 1. Claims 59-66 and 68-70 are dependent claims based on claim 51, and therefore include all of the limitations of that claim. Accordingly, the applicant submits that claims 51, 59-66, and 68-70 are allowable for at least the reasons discussed above in the context of claim 1.

d. Claims 71, 77-80 and 82-83

Claims 71, 77-80 and 82-83 are also rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Nova. Claim 71 is directed to a “computer-readable storage medium tangibly embodying a program” comprising instructions to perform a method directly analogous to that recited in claim 39. Accordingly, the applicant submits that claim 71 is allowable for at least the reasons discussed above in the context of claim 39.

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Claims 4-8 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nova in view of U.S. Patent No. 4,710,864 ("Li") and U.S. Patent No. 5,849,578 ("Falb"). Claims 4-8 are dependent claims based on claim 1 and recite, in addition to the limitations of that claim, limitations relating to the number of elements in the experiment matrix and the time it takes to provide experimental results. Nova is cited for its alleged disclosure of the limitations of claim 1. Li is cited for the alleged disclosure of experiment matrices including at least 50, at least 96, or 127 or more elements and of a variable amount of time before experimental results are available". Falb is cited for the alleged disclosure of providing experimental results to a user within 10, 20 or 50 days. As noted above, however, Nova fails to disclose, and also fails to suggest, every limitation of claim 1. The Office action does not contend that either Li or Falb discloses or suggests these features. Because the cited combination thus fails to disclose or suggest at least these features of the claims, the applicant submits that no *prima facie* showing of obviousness has been established. Claims 4-8 should therefore be allowed.

f. Claims 22-23 and 46

Claims 22-23 and 46 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nova in view of Lennon. Claim 22 has been cancelled, rendering the rejection moot as to that claim. Claim 23 is a dependent claim based on claim 1. In addition to the limitations of that claim, claim 23 recites that the first experiment request is received from the remote user over a computer network. Claim 46 is a dependent claim based on claim 39 and includes limitations analogous to those recited in claim 23.

Nova is cited for its alleged disclosure of the limitations of claim 1 and 39. Lennon is cited for its alleged disclosure of the generation and submission of experiment requests over a computer network. As noted above, however, Nova and Lennon fail to disclose, and also fail to suggest, every limitation of claim 1 or 39. Because the cited combination thus fails to disclose or suggest every limitation of the claims, the applicant submits that no *prima facie* showing of obviousness has been established. Claims 23 and 46 should therefore be allowed.

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g. Claims 25 & 28

Claims 25 and 28 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nova in view of U.S. Patent No. 5,969,121 ("Allen"). Claims 25 and 28 are dependent claims based on claim 1. In addition to the limitations of that claim, claim 25 recites that the first experiment design defines a set of experiments directed to chemicatalysis or biocatalysis. Claim 28 recites that the first experiment design defines a set of experiments directed to optimization of a chemical synthetic process (from claim 26) and that the set of experiments is directed to the preparation of fine chemicals.

Nova is cited for its alleged disclosure of the limitations of claim 1. Allen is cited for its alleged disclosure of experiments directed to chemicatalysis or biocatalysis (for claim 25) and fine chemicals (for claim 28). As noted above, however, Nova fails to disclose, and also fails to suggest, every limitation of claim 1. The Office action does not contend that Allen discloses or suggests these features. Because the cited combination thus fails to disclose or suggest at least these features of the claims, the applicant submits that no *prima facie* showing of obviousness has been established. Claims 25 and 28 should therefore be allowed.

h. Claim 30

Claim 30 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nova in view of U.S. Patent No. 5,569,799 ("Chen"). Claim 30 is a dependent claim based on claim 1 , and recites that the set of experiments is directed to the preparation of commodity chemicals. Nova is cited for its alleged disclosure of the limitations of claim 1. Chen is cited for its alleged disclosure of experiments directed to the preparation of commodity chemicals.

As noted above, however, Nova fails to disclose, and also fails to suggest, every limitation of claim. The Office action does not contend that Chen discloses or suggests these features. Because the cited combination thus fails to disclose or suggest at least these features of the claims, the applicant submits that no *prima facie* showing of obviousness has been established. Claim 30 should therefore be allowed.

i. Claims 17-21, 53-56, 67 and 72-76

Claims 17-21, 53-56, 67 and 72-76 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nova in view of U.S. Patent No. 5, 253,331

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(“Lorenzen”). Claim 17 is a dependent claim based on claim 1, and recites that the method comprises the additional steps of evaluating the first experiment design to generate an experimental plan describing a proposed execution of the set of experiments; providing the experimental plan to the remote user; and receiving an input from the user in response to the experimental plan. According to the claim, the steps of preparing the library of materials, the applying the process conditions, applying the screening method, and providing the experimental results are only performed when the user approves of the experimental plan. Claims 18-21 depend directly or indirectly from claim 17 and provide additional details regarding the evaluation by which the experimental plan is generated. Claims 53-56 are dependent claims based on claim 39, and include limitations analogous to those recited in claims 17, 19, 20 and 21, respectively. Claim 67 is a dependent claim based on claim 51 and includes limitations analogous to those recited in claim 17. Claims 72-76 are dependent claims based on claim 71, and include limitations analogous to those recited in claims 17-21.

Nova is cited for its alleged disclosure of the limitations of claim 1 (and the other independent claims), and for allegedly disclosing the evaluation of an experiment design to generate an experimental plan and the provision of the experimental plan to the user. Lorenzen is cited as allegedly disclosing the receipt of input in response to an experimental plan and the execution of a set of experiments only when the user approves of the plan. As noted above, however, Nova fails to disclose, and also fails to suggest, every limitation of claim 1 (and the other independent claims). Even assuming Nova discloses the generation and use of an experiment design as recited in the independent claims (which it does not, as discussed above), the reference does not disclose, or even suggest, the step of evaluating such an experiment design to generate an experimental plan, the provision of such an experimental plan to the user. The Office action does not contend that Lorenzen discloses or suggests these features. Because the cited combination thus fails to disclose or suggest at least these features of the claims, the applicant submits that no *prima facie* showing of obviousness has been established. Claims 17-21, 53-56, 67 and 72-76 should therefore be allowed.

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PATENT**j. Claim 81**

Claim 81 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nova in view of Lorenzen and Lennon. Claim 81 is a dependent claim based on claims 71 and 72, and recites that the experiment request is provided over a computer network. Nova is cited for its alleged disclosure of the limitations of claim 71. Lorenzen is cited as allegedly disclosing the receipt of an experimental plan and the communication of approval of the experimental plan to a remote laboratory. Lennon is cited as allegedly disclosing the communication of an experimental design over a computer network. As noted above, however, Nova fails to disclose, and also fails to suggest, every limitation of claim 71. The Office action does not contend that Lorenzen or Lennon disclose or suggest these features. Because the cited combination thus fails to disclose or suggest at least these features of the claims, the applicant submits that no *prima facie* showing of obviousness has been established. Claim 81 should therefore be allowed.

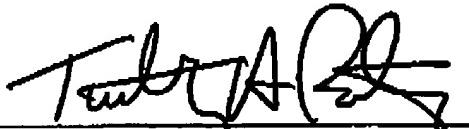
4. Conclusion

The applicant submits that all claims are now in condition for allowance. Please apply any charges or credits to Deposit Account No. 50-0496.

Respectfully submitted,

Date: 12/22/05

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